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The Oxford Museum.

THE SUBSTANCE OF A LECTURE

BY

HENRY W. ACLAND, M.D., F.R.S.,
REGIUS PROFESSOR OF MEDICINE;

WITH

EXTRACTS FROM A LETTER

BY

JOHN PHILLIPS, M.A., D.C.L., F.R.S.,
PROFESSOR OF GEOLOGY, AND KEEPER OF THE MUSEUM.

Fourth Edition,
With a short Summary of the Contents of the Museum.

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1867.

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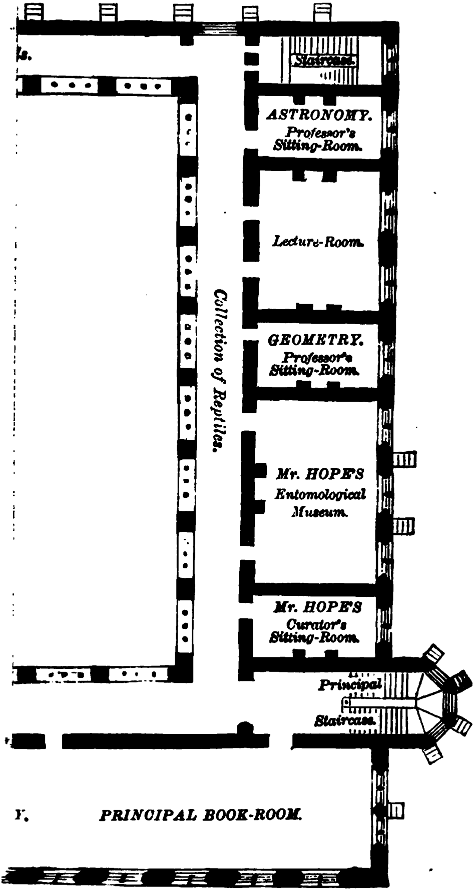
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Staircase.
ASTRONOMY.
Professor's
Sitting-Room.
Lecture-Room.
Collection of Reptiles.
GEOMETRY.
Professor's
Sitting-Room.
Mr. HOPE'S
Entomological
Museum.
Mr. HOPE'S
Curator's
Sitting-Room.
Principal
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PREFACE TO THE FIRST EDITION.

THE following pages contain the substance of some remarks which were made to the members of the Architectural Societies, at their request, that met in Oxford in the summer of last year. Pressing duties have hindered me till now from committing to paper, as nearly as my memory serves me, the matter of what was then said. I am induced, however, thus tardily to comply with a request made by various persons, that these remarks should be printed, because visitors in Oxford frequently seek information similar to that which it was my aim then to furnish.

It is, moreover, imperative on me to give the utmost publicity I can to the letters which Mr. Ruskin has addressed to me, the first in June last, and the second in January of this year, when I informed him I was about to print these remarks. It may seem presumptuous that I should couple my own name with his in a question which is partly one of Art; but we both feel pleasure in recording that, when fellow-undergraduates at Christ Church, we sketched together; and that, after a lapse of twenty years, we received on the same day the high distinction of an Honorary Studentship; because, though following divergent paths, we have honestly and laboriously cultivated the Arts which we respectively profess. To the intercourse on Art, and many kindred subjects, which for more than twenty years I have had *with Dr. Liddell,* the present Dean of Christ Church, with John Ruskin, Charles Newton, and George Richmond, I owe many happy hours of rest in the midst of happy labour, and am little disposed to forego the right to seek recreation in this or any other reasonable manner, because I am a Physician. On the contrary, I here declare that, though a man may be seduced from his duty, to his after misery, by any other absorbing interest, I yet believe that frequent intercourse with men engaged in other intellectual pursuits, is, in my profession at least, almost necessary to form a complete professional mind. I appeal to History in confirmation.

But, on the other side, I should be deeply pained, if in consequence of the interest I profess in the Art of the Oxford Museum, it were supposed by any whose opinion I value, either that I consider Art a subject on which amateurs can have perfect judgment, or that it is a matter which a Physician can seriously pursue. Yet I am of opinion that it is the duty of all persons who can help true-hearted and earnest Artists in these days, to aid in protecting them against unjust depreciation in efforts which, from many causes in this century and in our country, are necessarily, among the best men, tentative. Many have yet to learn the apparently simple truth, that to an Artist his Art is his means of probation in this life; and that, whatever it may have of frivolity to us, to him it is as the two or the five talents, to be accounted for hereafter. I might say much on this point, for the full scope of the word Art seems by some to be even now unrecognised. Before the period of printing, Art was the largest mode of permanently recording human thought; it was spoken in every epoch, in all countries, and delivered in almost every material. In buildings, on medals and coins, in porcelain and earthenware, on wood, ivory, *parchment, paper* and canvas, the graver or the pencil has recorded the ideas of every form of society, of every variety of race and of every character. What wonder that the Artist is jealous of his craft, and proud of his brotherhood? But as I hope that the time draws nigh when the professorial staff of Oxford will include a Professor of Art, I had better desist, and leave the matter in his hands. With the Art of this building, at all events, I have nothing whatever to do, except earnestly to aid in giving fair play and full opportunity to the eminently skilful persons, Deane and Woodward, who are now executing the work. For me and my fellow-teachers there, it is a place of other work altogether; and were it not that, as a Professor, I owe duty in this thing to the University, as a Physician I might regret every moment I had ever expended in aiding the architects in the Art part of their undertaking. In the department of Natural Science and of Medicine there is far too much yet to be done in this place, to allow any one, who is connected with them and has a choice in the matter, either time or energy for other occupations, unless by change they bring him the rest he needs. Like all other ancient things, Medicine is undergoing a stern cross-examination; it is learning more and more that, without depending wholly on positive science for its practical Art,—a thing *which never can be,*—it can no longer go on without every aid that science can afford; and therefore its disciples will all welcome such a building as is the subject of this Lecture, because it bids fair in a few years to disseminate widely, among a class of influential persons not hitherto reached, a knowledge of physiological truth and the truths of nature in general: because also it will help to keep before many of our most cultivated minds and our most influential thinkers the principles of sanitary knowledge in all its branches. I may not here dilate on this great national question; but they who look ahead will see, without aid from my pen, what mutual benefits will accrue from a closer union of the Sciences at the root of Medicine with the old Universities; and will further perceive that for the well-being of those very Sciences, the Practical Art which is in one sense their highest goal, must live, and make itself heard in its own peculiar notes, and strange, unwritten speech.

I must not, however, allow myself now to describe the full scope and prospects of an educational institution, such as this Museum; and yet I cannot bring to a close a preface already too long for a description which is too short, without repeating words which I ventured to use ten years ago [a] on this subject:—

"With respect to the proposal to add some study of the fundamental arrangements of the natural world to the general education of the place, I fear that if we do not *add* it, we may live to see, what would be a great national evil, such knowledge *substituted* for our present system."

The *addition* has been made; the *substitution* is, I hope, averted. The further my observation has extended, the more satisfied I am that no *knowledge* of *things* will supply the place of the early study of Letters—"literæ humaniores." Recent changes in the French universities fully confirm this opinion. I do not doubt the value of any honest mental labour. Indeed, since the *material* working of the Creator has been so far displayed to our gaze, it is both dangerous and full of impiety to resist its ennobling influence, even on the ground that His *moral* work is greater. But notwithstanding this, the study of language, of history, and of the thoughts of great men which they exhibit, seems to be almost necessary (as far as learning is necessary at all) for disciplining the heart, for elevating the soul, and for preparing the way for the growth in the young of their personal spiritual life: while, on the other side, the best corrective to pedantry in scholarship, and to conceit in mental philosophy, is the study of the facts and laws exhibited by Natural Science. H. W. ACLAND.

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[a] See page 39 of "Remarks on the Extension of Education in the University of Oxford." (Oxford: J. H. Parker. 1848.)

Oxford, Feb. 1, 1859.

◆

PREFACE TO THE SECOND EDITION.

THE Oxford Museum slowly approaches completion. The building will shortly sink into insignificance when compared to the contents it will display, and the minds it will mould.

The edifice will, however, stand as a record of loving labour, bestowed by a pure and refined artistic intelligence. It had the advantage of strong, but not unanimous, sympathy. It had not the command of an unlimited exchequer.

Now its real work begins; we may hope that the country will year by year feel more clearly the value of its scientific training, when engrafted in its due measure into the general education of the Old University.

The present edition gives the subjects of most of the carvings, the localities of the geological strata illustrated by the shafts, lists of the statues erected, and of the statues which are yet desired.

To the original remarks, at the expense, it is true, of chronological accuracy, there have now been added, here and there, descriptions which correspond to the progress of the building. This seemed preferable to retaining statements now inapplicable. H. W. A.

Oxford, June 15, 1860.

PREFACE TO THE THIRD EDITION.

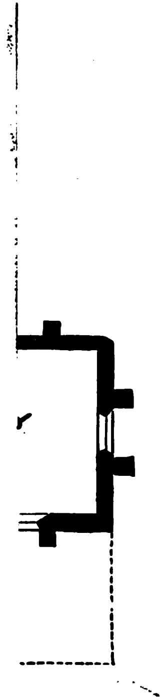
IT has been thought advisable to append to this E a Summary of the Contents of the Museum. F the writer is indebted to Mr. James Parker. The has thus both an explanation of the main purposes have been kept in view in planning and arrangin Museum, and a guide to assist him in examining in the objects which are placed there. The Letters fro Ruskin, which appeared in the previous editions, w issued separately. It is intended shortly to publish a Memoir of Mr. Woodward, the Architect, who wit Thomas Deane and Mr. Deane designed the building.

June, 1866. H. W. A

GROVND PLAN

REFERENCE.

A	*Entrance Hall.*
B	*Porter.*
C	*Sitting Rooms.*
D	*Apparatus Room.*
E	*Work Rooms.*
F	*Lecture Rooms.*
G	*Dissecting Room.*
H	*Laboratory.*
I	*Principal Staircase.*
K	*Passage.*
L	*Sitting Room.*
M	*Professors' Work Room.*
N	*Staircase for Anatomical and Zoological Department.*
O	*Covered Way.*
P	*Macerating Room.*
S	*Private Stairs to Anatomy Lecture Room.*
T	*Store Rooms.*
U	*Prælector's Laboratory (Mineralogy).*
V	*Balance Rooms.*
X	*Furnace Room.*
Y	*Large Laboratory.*
Z	*Lavatories.*



THE OXFORD MUSEUM:

THE SUBSTANCE OF A LECTURE TO AN ARCHITECTURAL SOCIETY.

BY

HENRY W. ACLAND, M.D., F.R.S.,

REGIUS PROFESSOR OF MEDICINE, ETC.

WHEN a critic in Art approaches an architectural edifice, he asks, first, to what uses is this building destined?—next, how far does it in a skilful manner interweave beauty with convenience of arrangement?—and how far, subjected to the imposed conditions of climate, site, and accessibility of materials, does it express the object for which it was intended?

You, therefore, who come as critics, ask three things, and in answer, I will endeavour to state:—

1st. The circumstances which in the history of Oxford made this effort for enlarging her means of education necessary.

2ndly. The objects which those members of the University who for many years advocated this design have steadily kept in view.

3rdly. The way in which the Architects have performed the task assigned to them.

In other words, it is my duty to relate why extension of our buildings was necessary; what is the object of that extension; and what was the spirit in which the required building was begun.

First, then, as to the causes which called for extension of the national education at Oxford, in the direction of Natural Science. These must be briefly stated.

The great tide of human thought had set for centuries, and down even to the close of the Middle Ages, chiefly in the direction of speculative reasoning, poetry, or history. Many circumstances in the condition of the world tended to repress the outbreak of inquiring and eager interests in external Nature, which about the time of the discovery of the New World dawned upon all the educated part of mankind. It is not other than both remarkable and humiliating, that some of those who studied and taught the mental science of Aristotle, or the speculative dogmas of the schoolmen, should have wholly forgotten the successful energy which Aristotle and Galen, in the very dawn of literature, had expended on investigating the laws of organic life. It is probable, indeed, that the very condition of the Church in the Middle Ages, which led men to study the

Bible less and value their own fancies more, did in fact close their eyes to the astonishing revelations of the unwritten as well as of the written Word of God.

Oxford, "the ancient seat of learning," was not exempt from this intellectual one-sidedness. It chiefly cultivated classic lore, and pursued the metaphysical notions of the schoolmen; even these were not always taught in the far-seeing spirit of true philosophy. It has taken some centuries from the epoch of Roger Bacon, followed here by Boyle, Harvey, Linacre, and Sydenham, besides nearly 200 years of unbroken publication of the Royal Society's Transactions, to persuade this great English University to engraft, as a substantial part of the education of her youth, any knowledge of the great material design of which the Supreme Master-Worker has made us a constituent part. "The study of mankind," indeed, was "Man;" but in Oxford it was Man viewed apart from all those external circumstances and conditions by which his probation on earth was made by his Maker possible, and through whose agency, for good or evil, his life here, and preparation for life hereafter, were ordained.

Seeing, then, all these things, many here in Oxford, not so much by concert, as by that strange unanimity which comes to some subjects in the fulness of their time, felt as by an instinct that they might not rest until means for rightly studying what is vouchsafed for man to know of this universe were accorded to the youth committed to their care, and to themselves. From such causes and from so deep convictions has arisen the Oxford Museum.

Nor was the present an inappropriate or unexpected time for a work conceived in this temper. Oxford possessed more than the current knowledge of the day; and the light which had been brought so multifariously to bear on Nature, by many great minds in Europe, from Bacon to Cuvier, had been specially imparted to us in the first half of this century. Partly by oral instruction from Kidd, Buckland, Daubeny, Walker, the two Duncans, and many others, both in their several lecture-rooms and within the walls of old Elias Ashmole; and partly, I must add, by the various enlightened acts and wise expenditure of the Radcliffe Trustees. They many years since devoted their library entirely to works on Medicine and Natural History, expending large sums, restricted only by the little fruit they bore: they have also, by the development of a first-class Observatory, and especially through the labours of Manuel Johnson, added new lustre to the University of Halley, and Bradley, and Gregory.

To enlarge, however, on all the details of this progress would be now of little interest. We look more to the future than to the past. Thankful for the benefits we have inherited, and jealous of the honour of our fathers, we, as practical men, take still deeper interest in the destiny of our children,—desiring that we leave them not worse provided in the gifts of their age, than by God's mercy, and the foreseeing nobleness of our forefathers we found ourselves in those of our own.

You ask, in the SECOND place, What objects have the promoters of the Museum kept in view while advocating its erection?

"There are two books," says Sir T. Browne, "from which I collect my divinity; besides that written one of God, another of His servant, Nature,—that universal and public manuscript that lies expansed unto the eyes of all." In this term 'Nature' are, of course, included every known and observed form of matter by which our world and its inhabitants were either made or are maintained, and whatever laws of their construction or for their maintenance have by reason been inferred. No less signification of the word Nature will in the present day be accepted; the limitation of the term History of Nature to a small portion of the biological sciences is not now, of course, admitted. But even this explanation does not adequately express the idea of the word Nature: the word implies not only the facts and the laws that have been noted in the structure and peopling of the globe, but still more the relation which all those facts and laws bear to each other, in one harmonious whole; and yet one step further, in some limited instances, the first glimpses of unuttered ideas—traces (as some believe), though we see them darkly as in a mirror, of unexpressed Art of the great Artificer.

To state the divisions which have been found necessary or convenient for the purposes of student or teacher in this vast inquiry is to enumerate the principal sciences belonging to the History of Nature, and therefore the departments to which, in the Museum, places are assigned. In these departments there are many subdivisions; some of which are themselves already erected into great and comprehensive subjects. They cannot all be separately represented here; for this educational institution is not the effort of a great government, nor the exhibition of the scientific collections of a nation, but an abstract, as it were, fitted for the grasp of a single person,—or a standing-point, from whence the intelligent learner may take a general survey of a great field of knowledge, which, be his powers what they may, *in his lifetime* he can never completely investigate.

Our object, then, is—1st, to give the learner a general view of the planet on which he lives, of its constituent parts, and of the relations which it occupies as a world among worlds: and 2ndly, to enable him to study, in the most complete scientific manner, and for any purpose, any detailed portion which his powers qualify him to grasp.

The Astronomer, with his apparatus, may here introduce the student to the phenomena observed in that space of which we occupy an infinitesimal portion, and may explain the means and the powers by which these phenomena have been observed and can be predicted. The Professor of Geometry will be able to aid the further explanation of those abstruse calculations, bringing his knowledge to bear upon terrestrial as well as cosmical instances. In the department of Experimental Physics, the student will, guided by his teacher, submit to experiment (as far as they obey the hand or bend to the skill of man) the most general agents and powers, which are either diffused through space,—such as light; or are daily but universally needed in the organic or inorganic changes of our earth,—as water and air. The Higher Mathematical truths upon which the theories of Experimental Physics depend, can be pursued by him in the Class-room of the Professor of Natural Philosophy. Scarcely removed from these departments, he may next examine in the Chemical laboratories those endless changes which nature in her ordinary course, or the skill of man by contrived combinations, may bring about in the matter of which this earth is composed,—a department which has severed from itself, more for convenience than by reason, its special school of Mineralogy. So, insensibly, but well prepared, he will approach, in the Geological collections and afterwards among the rocks themselves, the study of the development of the earth, the history of the convulsions by which it has attained its present form, the way in which its surface is disposed, and, by necessity, the characters, structure, life, origin, and decay of its past and present inhabitants.

Without the Geologist on one side, and the Anatomist and Physiologist on the other, Zoology is not worthy of its name. The student of life, bearing in mind the more general laws which in the several departments above named he will have sought to appreciate, will find in the collections of Zoology, combined with the Geological specimens and the dissections of the Anatomist, a boundless field of interest and of inquiry, to which almost every other science lends its aid; from each science he borrows a special light to guide him through the ranges of extinct and existing animal forms, from the lowest up to the highest type, which, last and most perfect, but pre-shadowed in previous ages, is seen in Man. By the aid of physiological illustrations he begins to understand how hard to unravel are the complex mechanisms and prescient intentions of the Maker of all; and he slowly learns to appreciate what exquisite care is needed for discovering the real action of even an apparently comprehended organ. And so at last, almost bewildered, but not cast down, he attempts to scrutinize, in the rooms devoted to Medicine, the various injuries which man is doomed to undergo in his progress towards death; he begins to revere the beneficent contrivances which shine forth in the midst of suffering and disease, and to veil his face before the mysterious alterations of structure, to which there seem attached pain, with scarce relief, and a steady advance, without a check, to death. He will look, and as he looks, will cherish hope, not unmixed with prayer, that the great Art of Healing may by all these things advance, and that by the progress of profounder science, by the spread among the people of the resultant practical knowledge, by stricter obedience to physiological laws, by a consequent more self-denying spirit, some disorders may at a future day be cured, which cannot be prevented, and some perhaps prevented, which never can be cured.

These, then, are the departments to which we assign, for mutual aid and easy interchange of reference and comparison, a common habitation under one roof: Astronomy, Geometry, Experimental Physics, with their Mathematics; Chemistry, Mineralogy, Geology, Zoology, Anatomy, Physiology, Medicine.

In the THIRD place, you must consider the way in which the Architects have provided for these wants.

It is quite unnecessary to describe more particularly the steps by which we obtained the design which you have come to criticize, and which is here brought to a practical result, than by saying generally, that the Professors of the subjects which have been named, having decided on the space which each required for satisfying (I am bound to say in the most limited manner consistent with efficiency) their several wants, the University decided on allowing a grant of 30,000*l.* for the shell of the building, leaving to future determination its interior fittings and various incidental expenses, such as warming, lighting, draining, planting, fencing, and the like. In the competition, scarce any limitation was imposed, and to style none. Thirty-two designs by anonymous contributors were sent in. They were in all styles. Some professed advocates of Gothic architecture on this occasion deprecated the application of Gothic Art to secular purposes,—thereby denying to their own style that malleability which is, perhaps, its highest prerogative. But at length the design "*Nisi Dominus ædificaverit domum*" was selected. It turned out to be by the architects of the Dublin Museum. I have seen no reason to regret the decision of the University.

It is but just to the Architect and to the University to say to you at once that the task has been a difficult one. The University granted a sum, which was perhaps the most it could, in justice to other departments, afford for the proposed purpose; the sum was well known to be barely sufficient to raise a building of the cubical contents which the Professors required for their several departments; and therefore it must be admitted at once, that, without blame to either party, there is on all sides evidence, both in material and design, of a rigorously restrained expenditure, just as in respect of material and finish the direct contrary may be noticed in another structure, recently built for the University by my esteemed friend Mr. Cockerell,—the Taylor Institution.

Once for all on the subject of cost,—a consideration of the utmost importance in the relation between employers and employed in the matter of building,—I am happy here to record that it is within my personal knowledge that extraordinary and unsparing pains have been taken by Woodward[a] and Deane to produce, often with great additional labour to themselves, the almost impossible combination of artistic effect and complete convenience with most limited means.

No Physician will probably be heard on the subject of Art, so that it were waste of time, both to you and to me, to express, even if I hold them, many opinions on this matter; but still, as one of those appointed by the University to select a design, it was my duty to satisfy myself on certain salient principles, of which I will state two.

First, That in the selection of a style for a scientific building, the first consideration with me was its practical fitness for its purpose; that, in this respect of capacity of adaptation to any given wants, Gothic has no superior in any known form of Art, of any period or country; that this being so, it is, upon the whole, the best suited to the general architectural character of mediæval Oxford.

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[a] Since this lecture was delivered, Benjamin Woodward, a true Artist, died beloved by all who knew him, alone in an inn at *Lyons.*

Secondly, That supposing Gothic to be adopted, it must in all respects adapt itself to the necessities of the departments; in no way impose its Art to the hindrance of our convenience; it must confine its ornaments to subjects more or less connected with the objects of the building, as the Middle Age architects confined their ecclesiastical decorations in sacred edifices; it must be willing to use whatever material the skill of modern ages has placed at the disposal of the builder; and the arrangements of various kinds should not, on account of Gothic associations, be inferior in mechanical skill or other convenience to the forms or methods now in general use.

Believing in these principles, I think the University was right in adopting Woodward and Deane's design.

It remains only, therefore, to describe the general plan by which the union has been effected between the professorial demands and financial conditions on the one hand, and the requirements of Gothic Architecture, as interpreted by a refined and almost fastidious artist, on the other.

A few words will explain the principles which determined the kind of accommodation.

For the illustration of Nature the student requires four things: first, the work-room, where he may practically see and work for himself; secondly, the lecture-room, where he may see and be taught that which by himself he can neither see nor learn, and, as an adjunct to these, a room for more private study for each; thirdly, general space for the common display of any illustrative specimens capable of preservation,—so placed, in relation to the rest of the building, as to be convenient for reference and comparison between all the different branches; and lastly a library, in which whatever has been done, or is now doing, in the science of this and other periods and countries, may be conveniently ascertained.

The centre of the edifice, which is intended to contain the Collections, consists of a quadrangle. This large area is covered by a glass roof, supported on cast-iron columns. The ornaments of the spandrils (due to the admirable skill of Mr. Skidmore of Coventry) are in wrought iron. The rigid (cast) material supports the vertical pressure; the malleable (wrought) iron is employed for the ornament, and is chiefly hand-wrought. The present roof is the second that has been erected. It had been believed that a departure could be safely made from the original designs of Deane and Woodward for the sake of lightness of form; and that for the same reason the supports might be made of wrought iron tubes. This experiment failed, and a structure on the general principle of the original design has replaced the attempt. Some persons will probably regret that when the new roof was erected, it was hopeless for the Architects to propose, as they would have wished, the substitution of stone shafts, few in number, to support the roof. A step, but not a final step, has been made towards an harmonious union of the ironwork of the 19th century with the refined architecture of the middle ages.

The wrought iron ornaments represent, in the large spandrils that occupy the interspaces between the arches of the principal aisles, large interwoven branches, with leaf and flower and fruit, of lime, chesnut, sycamore, walnut, palm, and other trees and shrubs, of native or of exotic growth; and in various parts of the lesser decorations, in the capitals, and nestled in the trefoils of the girders, leaves of elm, briar, water-lily, passion-flower, ivy, holly, and many others, which hereafter a catalogue will enumerate.

The central court is surrounded by an open arcade of two stories. This arcade furnishes ready means of communication between the several departments and their collections in the area. The roof springs from above the upper arcade, so that the arcades on both floors are open to the covered court.

The arcade on the ground floor is entered from the centre of each side of the court, and ready communication is made from it to every part of the collection. In each of the arcades are seven piers forming eight openings, and carrying eight discharging arches, within which are two lesser arches, resting on their outer sides on the piers, and at their junction with each other on a shaft with a capital and base.

On the upper story there is a similar arrangement, excepting only that the piers and shafts are of less height, though the piers are of the same number; on this account, in the same horizontal space between each pier four arches are supported by three shafts in the upper arcade, instead of, as below, two arches supported at their union by one shaft.

There are, on the ground floor, thirty-three piers and thirty shafts—on the upper floor, thirty-three piers and ninety-five shafts. Thus one hundred and twenty-five shafts surround the court; and if we include the capitals and bases of the piers, there are one hundred and ninety-one capitals and bases[b].

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[b] The number of shafts and piers on the side by which you enter differs from the other three sides; hence the uneven numbers.

The shafts have been carefully selected, under the direction of the Professor of Geology, from quarries which furnish examples of many of the most important rocks of the British Islands.

They who desire to examine in detail the shafts and the illustrative carvings should proceed to the right from the entrance, as far as the angle, and then return to the left. They will thus follow the Rocks as Professor Phillips has placed them[c], and will have the names of the Plants which have been represented in natural groups, more or less idealized, or literally copied, by the workmen.

On the lower arcade are placed, on the west side, the granitic series; on the east, the metamorphic; on the north, calcareous rocks, chiefly from Ireland; on the south, the marbles of England. In the upper floor, as far as may be, an analogous distribution is adopted[d].

In a table which is given hereafter, the kind of rocks, their localities, and the carvings which accompany them, are noticed. The visitor having completed the circuit of the ground floor, may ascend by the south staircase to the upper floor, and pass round to the right, examining the columns from the south-west angle,—that which he meets at the head of the southern stairs.

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[c] See p. 37, and Professor Phillips' remarks.

[d] Further particulars of these shafts, and of the arrangements of the plants represented in the capitals, are given by Professor Phillips. See p. 38.

The capitals and bases represent various groups of plants and animals, illustrating different climates and various epochs. They are mainly arranged according to their natural orders, and are the more required to represent the vegetable creation, as the botanical collections will remain, very properly, at the Botanical Gardens.

On massive corbels, projecting from the fronts of the piers, there are placed the statues of great men who first discovered, or first brought to important results, the several branches of knowledge which the edifice is intended to promote. As those who have laid the deepest and widest the foundations of science, Aristotle and Bacon are set up at the portal,—the one given by Her Majesty the Queen, the other by Undergraduates of Oxford. In the mathematical department are placed Euclid and Leibnitz; in the astronomical, Newton and Galileo; in that of physics, Oersted[e]; in the chemical, Davy, and Priestley; in that of zoology and botany, Linnæus; in that of medicine, Hippocrates, and Harvey; in that of applied mechanics, Watt and Stephenson. These all are already set here for the contemplation and exnple of all who may hereafter enter, with various rpose, this place of study and of work.

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[e] Not yet erected.

But the history of Science even by its most nspicuous landmarks is not to be sketched thout many more names than these. We de-re to set before the visitor the statue of Des-rtes; to recal to all comers the memory of grange among mathematicians; of Hippar-us and Kepler among astronomers; of Archi-edes, Roger Bacon, Robert Boyle, Franklin, oung, among physicists; of Lavoisier and Stahl ong chemists; of Hutton and Werner among ologists; of Ray, Jussieu, and Humboldt among ologists and botanists; of Hunter, Haller, and Sydenham among those who have most ad-nced physiology and medicine.

Here I must not omit to record that the ex-ession in the architecture, by this simple and ppy method, of the intentions of the building, s engrafted upon it as the work went on, and s not (I need hardly say) included in the first sign, or in the original estimate. All this has ce been added by the zealous munificence of ny friends of our undertaking.

I may be excused for here repeating a public t. Her Majesty Queen Victoria was made quainted with the circumstance that these tues could be erected only by private gift:

a hope was expressed that if Her Majesty thought fit to set an example to contributors, she would choose as her donation the first of the great school of modern science, himself an Englishman, Francis Lord Bacon. In reply, the royal, and, more also, the kindly announcement, reached the University, that not Bacon only, but the four great names that followed next on the proposed list of discoverers, should be executed by Her Majesty's command and at her own costs. And I know not but that this gracious act was enhanced in value, when it was made known by the Chancellor on the same occasion on which the Queen's gift was publicly announced, that the Undergraduates had offered to erect the monuments to Aristotle and Cuvier.

Several offers have been made to place inscriptions in carving or in colour on the walls of the corridors, in the libraries, or in the several departments. How curiously instructive some of these might be! Take two for example, in the Medical Department — this quaint saying and pregnant rebuke recorded by Stobæus:—

"Τρόφιλος ἰατρὸς ἐρωτηθεὶς, τίς ἂν γένοιτο τέλειος ἰατρός. Ὁ τὰ δυνατὰ, ἔφη, καὶ τὰ μὴ δυνατὰ δυνάμενος διαγιγνώσκειν."

"Trophilus the physician being asked who is a perfect physician, gave answer, 'He who distinguishes between what can, and what cannot be done.'"

Then the weighty but half-known words with which Hippocrates solemnly begins his instructions:—

"*Ὁ βίος βραχὺς, ἡ δὲ τέχνη μακρὴ, ὁ δὲ καιρὸς ὀξὺς, ἡ δὲ πεῖρα σφαλερὴ, ἡ δὲ κρίσις χαλεπή.*"

"Life is short;
but
Art long;
Opportunities fleeting;
Experience deceitful;
True judgment difficult."

Or the saying of Sir Thomas Browne:—

"NATURE is the ART of GOD."

Shall we add, with perhaps new significance,—

"Ipsi peribunt, TU autem permanes: et omnes sicut vestimentum veterascent."

Great hopes are entertained that means will be obtained for painting in fresco the brick spandrils now left bare for this purpose in the area; and that then, in subordinated harmony to the general effect, the colouring of the iron-work may be attempted, and the present temporary greys rectified. Many of the rooms are already coloured, and serve as an illustration of cheap and simple, yet artistic decoration. One room has been illustrated by a large geological painting of the Mer de Glace, and by one of the lava streams of Vesuvius; these are due to the leisure hours of a parochial clergyman, the Rev. R. St. John Tyrwhitt. Ample wall-space awaits similar industry, and, we will hope, as successful effort.

Round the arcade is ranged upon three sides the main block of the building. The east is wisely left unencumbered by rooms, to afford ready means for future extension: land has been purchased, which will admit of such extension whenever it is required. I may not describe the main block in detail; you can visit such departments as you think fit. The most complete and largest is that of Chemistry, because the practical work of that extensive subject is likely to be here most extensively carried on. To every department is attached a lecture-room, a private room, and, wherever required, work-rooms and laboratories.

The order in which the departments are reached is—on the right of the entrance the department of Chemistry; on the south side, first the Physical, next the Mineralogical and Geological rooms; to the left of the entrance the rooms devoted to Medicine; on the north the rooms for the Delegates and the Keeper, and the Physiological establishment.

The Area itself contains the typical illustrations for study, viz., in the South Aisle, such as may be thought proper for display by the Professors of Mathematics, Astronomy, and Physics. Mineralogical specimens and Chemical substances are also arranged in this quarter.

The great Central Aisle shews Zoological and Geological collections; and we of Oxford may hope the memory of BUCKLAND will long cling to the treasures his energy collected and his genius illuminated.

The remaining space to the North is devoted to the Ashmolean collections in Zoology, to the Physiological series which the enlightened liberality of Dean Liddell and the Chapter of Christ Church has allowed to be removed thither, and to the constant additions made thereto by Professor Rolleston.

Beyond or outside the main block, to the north, because the coolest side, are the Anatomical and Zoological departments, with an open yard, and beyond it, Dissecting-rooms. On the south side, are the rooms which require special arrangements for experiments on light; a yard for purposes connected with Chemistry and Experimental Physics; and further still, out-buildings, containing work-shops, furnace-rooms, balance-rooms, and laboratories. Thus all noxious operations are removed from the principal pile, but joined with much convenience to the lecture-rooms, and communicating easily with the Central Court, common to all the departments.

The laboratory for the chemical students is the large detached building seen at the south-west angle of the Museum. The Abbot's kitchen at Glastonbury will be recognised by you as the prototype. There can be no more successful adaptation of an ancient example to modern wants, inasmuch as no more convenient nor more airy laboratory could be contrived, and certainly no bolder or more picturesque design.

On the upper floor are a large lecture-room for 500 persons intended for occasional use, furnished with gas and ample water supply, with efficient drainage, for experiments; the rooms for the Astronomical and Mathematical Professors, and the Entomological collections of Mr. Hope; and along the front, the Library and Reading-rooms, together 200 feet in length.

The important scientific Library held in trust and maintained by the Radcliffe Trustees[f], has by the liberal policy of that body, been transferred from their own splendid edifice, by way of loan, to the fine rooms in the West Front, upon this Upper Floor. A more valuable contribution to the progress of science in Oxford could not have been made. £500 are expended annually in new works. A large collection of Periodicals and Transactions, together with the books recently added, and books of Reference, are kept in the North Reading-room. Under certain regulations this Room is open to all visitors at the Museum, for the purpose of study. The subjects on which books are provided, are—

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[f] The Radcliffe Trustees who were parties to this agreement were the Earl Bathurst, The Rt. Hon. and Hon. Sidney Herbert, M.P., The Rt. Hon. W. E. Gladstone, M.P., The Rt. *Hon.* T. Sotheron-Estcourt, M.P., W. Dugdale, Esq.

Philosophy of the Inductive Sciences.
Mathematics.
Physics.
Chemistry.
Mineralogy.
Geology.
Geography.
Meteorology.
Palæontology.
Zoölogy.
Anatomy.
Physiology.
Ethnology.
Botany.
Medicine.
Surgery.
Materia Medica.
Medical Jurisprudence.
Hygiene.

By a convenient arrangement the *ordinary* works under these heads are kept in classes for the use of beginners. An Artist is engaged in the same room for the purpose of making original drawings of scientific objects, and of instructing Natural History students in drawing from Nature.

Lastly, I will but mention the graceful building which at the south-east angle gives a residence to the Curator. The elegance of its form, and the beauty of its many details, will long tell the tale, that the soul of its architect yearned after the subtler refinements of Gothic Art; and will say, in unmistakeable terms, what that man might have accomplished had ample means been ever placed at his command.

Here, then, I must stop,—but not before I have added, that while this building was in progress, we were not wholly unmindful of the hardy hands that worked for its erection. Alas! we can do little for each other, to ease the daily toil, and sweeten the hard-earned bread. But with the laying the foundation-stone we also erected a humble mess-room by its side, where the workmen daily met for their stated meals, began each day with simple prayers from willing hearts, had various volumes placed for their use, and received frequent instruction and aid from the chief officer in the building, Mr. Bramwell, our clerk of the works.

The temper of the Architect reached the men. In their work they had pleasure. The capitals were partly designed by the men themselves, and especially by the family of O'Shea, who brought wit and alacrity from the Emerald Isle to their cheerful task. The carving of the capitals and the decoration of the windows, *limited, very* limited, as our means have been, have raised ever-living interest; and as strangers walk in the streets, ever and anon they hear the theme discussed by the workers who pass by.

May the work prosper!—and in many succeeding generations, when we are long forgotten, may young minds be here freshly learning and warmly loving the things which they may be allowed to perceive as in a mirror, dimly; but which we, by the ineffable grace of God, may, in ways at present unconceived, be then beholding, and knowing them then as they are known.

These pages have attempted to illustrate the general scope of the Museum—its aims in Art—its purpose as an Educational institution. But the building must henceforward be thought of only as a frame made by a skilful Artist—a frame in which to set the records of that Art which is wrought without hands.

THE ARCADES OF THE CENTRAL COURT.

By JOHN PHILLIPS, D.C.L., F.R.S.[a],

PROFESSOR OF GEOLOGY, ETC.

The British marbles are still only partially known. Including in the term marbles something more than the "marmora" of our early mineralogists, and including granite rocks, serpentines, &c., we *desired* to obtain specimens of all the more important kinds — important on grounds of scientific interest, as well as for their commercial value and architectural utility. Here and there our efforts failed; we could not "for love or money" get the stone we wanted; but on the whole our success is much beyond any previous example in this, and, I believe, in any country.

In the arrangement of the many valuable and curious examples of polishable stones which the liberality of our friends has enabled us to bring together, we have always *desired* to employ so much of system as to make these ornamental parts of the fabric *really* and *obviously useful* as a part of the exhibition of natural objects. Regarding the rocks as of aqueous or igneous origin, and of unequal geological date, we wished to exhibit these relations in our building, by giving to each group an appropriate place. It was found, after great efforts, possible to accomplish this to a considerable extent, but not quite so perfectly as was hoped. The principal reason is that we could not obtain certain marbles known 150 and more years since, to complete our series of mesozoic limestones.

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[a] These observations are taken from a letter of Professor *Phillips to Dr.* Acland.

If now you will stand in the centre of the great court, and turn your eyes to the west, "*solis ad occasum*," you will see, in the lower range of shafts, six fine examples of granite and its twin brother syenite. First, on the left, Aberdeen grey granite, surmounted by the sculptured capital of Alismaceous plants; next, Aberdeen red granite, crowned by the Butomaceæ; then the largely porphyritic grey granite of Lamorna, with a capital of the date-palm. On the other side of the entrance stands my special column of syenite from Charnwood Forest, with the cocoa-palm for its crown; then the beautiful mottled granite of Cruachan, elaborated for us by the Marquis of Breadalbane, the capital being Pontederaceæ; and finally, the red granite of Ross in Mull, the gift of the Duke of Argyll, whose capital is Liliaceous.

I don't at all intend to lead you so slowly round the remainder of the quadrangle. On the north you see eight shafts, all from Ireland or

Devonshire, all belonging to palæozoic, stratified, or metamorphic rocks. At the extreme are the beautiful marbles of Torquay and Marychurch—between them the green serpentinous marbles of Galway, and red and black tinted limestones of Cork, Limerick, &c. The capitals are Acotyledonous or Monocotyledonous, as Gramineæ, Acoraceæ, &c.

Now turn to the east, and behold a second set of igneous and metamorphic rocks, to face the old granites and porphyries. Here, on the left, (next to Marychurch column,) you see your own Killerton rock (ancient, — how ancient!) lava, crowned with Zamiaceæ, from which peeps the Didelphys; next the rock of Trerice, its capital will be a thorny Zamia; then Roche gives a shaft to be capped by Cupressinæ; next are two serpentines with capitals of Abietinæ and Araucarinæ; Inverara porphyry follows, and supports sculptured branches of Taxaceæ. St. Leven's porphyry and black serpentine complete this series, and bear on their heads plants of the orders Smilaceæ and Dioscoraceæ.

On the south you have a beautiful and pretty-well-known series of English and Welsh marbles, mostly of the carboniferous limestone, but including what are less commonly seen, the breccia of Mendip and the gypsum of Chellaston. The plants destined to furnish capitals for these are the Monocotyledonous orders, as Orchidaceæ, Musaceæ, Iridaceæ, &c.

Thus we have thirty shafts of the larger size placed, with their thirty capitals executed or planned. Besides the thirty capitals we have to provide sixty corbels, and are doing this so as to add to each capital a neighbour bearing some natural affinity to it. Only in one instance has this been departed from; it is in the corbel of the Malvaceæ, close by the Filices—a case of two quite different groups wonderfully executed, and looking at each other with mutual admiration!

Now, ascend to the upper corridor, and survey the smaller shafts, to the number of ninety-six, which appear on its four sides. As yet no capitals are carved on them. Beginning on the west side, and following the same order as for the shafts below, you find the whole corridor (twenty-four shafts) occupied by granite, porphyry, serpentine, &c. Among them are granites of Aberdeen, Criffel, and Cornwall—porphyritic granites of remarkable richness (often called porphyry), elvans, porphyries, and various quartzose compounds.

The capitals for these shafts will be all selected from the Corolliflorous division of Dicotyledonous plants.

The northern upper corridor is wholly filled with marbles from the carboniferous limestone and older rocks of Ireland, including the serpentine of Galway. The capitals will exemplify Monochlamydeous plants and Rhizanths.

On the western side the series of shafts is varied. It was not found possible to obtain for this side all the marbles formerly known and used in the Oolitic and Wealden districts of England; and some of the bays have been filled with other rocks which it was desirable to exhibit. At the extremities we have from Nottinghamshire, Derbyshire, and Somersetshire specimens of the Permian limestones, triassic breccia, and gypsum—in the centre are granites of Jersey and Cornwall—flanked by columns of slate and shafts of lias, blue and white; marbles of Purbeck, Stamford, and Buckingham.

The capitals of these shafts will be designed from the Thalamiflorous division of the Dicotyledonous plants.

Lastly, on the south side is a series of the finest rocks belonging to the carboniferous and Devonian limestones of England and Wales, including the crinoidal marble of Dent (the birthplace of Sedgwick, who gives the shaft), the various marbles of Durham, Derbyshire, Plymouth, Torquay, Anglesea, and South Wales. It will be interesting to compare these with the coeval rocks of Ireland, which stand opposite to them. The capitals of these will be ornamented by Calycifiorous Dicotyledons.

Thus, as far as possible, the representations of plants (varied here and there by animals geographically and naturally associated with them) are placed, with so much of system as to help the memory, and are sculptured with so much attention to their natural habit as to satisfy the botanist as well as the artist, neither of whom can expect the most skilful human hand to express in rough stone, by means of hard steel, all the delicacy and grace which, with finer materials and by finer processes, the GREAT ARTIFICER moulds the lilies of the field and the leaves of the forest.

I need not remind you that with this view of the utility and meaning of the arrangement of our subjects, the architects (who have been very zealous in their efforts to make the whole successful) have been always able to combine what is due to the building as a work of art; nor am I aware that *their* opinions and *ours* have been in the least degree difficult to reconcile. We must not forget the sculptors, who have worked with singular zeal and ability. Finally, this is not a haphazard collection of pretty stones crowned by pretty flowers, but a selection of marbles and sculptures, intended to illustrate points of some interest and importance in science and art. Upon the whole, you will probably not regret to have given so much time and attention to this matter; all that is told me confirms my own opinion that it was well worth while to make this trial to combine grace with utility, and that the result will not be disappointing to those who have given us money for our work, and what is more precious, their full confidence that we should use it with liberality and prudence.

A LIST OF THE SHAFTS[a], WITH THE SUBJECTS OF THE CAPITALS AND CORBELS.

◆

LOWER ARCADE,

(West side, going North).

Shafts.		Capitals and Corbels. *The corbels marked* c.
1. Grey granite: Aberdeen.	*Alismaceæ*	c. Sagittaria sagittifolia. Alisma Plantago. c. Alisma ranunculoides.
2. Red granite: Peterhead.	*Butomaceæ*	c. Limnocharis. Butomus umbellatus. c. Limnocharis.
3. Porphyritic grey granite from Lamorna (Cornwall).	*Palmaceæ*	c. Fan-palm. Date-palm. c. Fan-palm.
4. Green syenite from Markfield Knowle, Leicestershire.	*Palmaceæ*	c. Phœnix. Cocoa-palm. c. Caryota.
5. Pale reddish Granite: Ben Cruachan, Argyleshire.	*Pontederaceæ*	c. Tradescantia. Colchicum and Pontederia. c. Dracæna.
6. Red granite of Ross in Mull.	*Liliaceæ*	c. Yucca. Lilium, Tulipa, Fritillaria. c. Aloe.

Lower Arcade, (North side, going East).

7. Devonian limestone: Torquay.	*Pandanaceæ*	c. Sagittaria. Pandanus (screw-pine). c. Cyclamen.
8. Mountain limestone: Cork.	*Typhaceæ*	c. Typha. Sparganium ramosum. c. Typha.
9. Mountain limestone: King's County.	*Araceæ*	c. Arum, Pothos. Dracunculus vulgaris. c. Caladium.

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[a] It will be seen that the shafts are numbered. The numbers in the list agree with the figures beneath the shafts.

SHAFTS.		CAPITALS AND CORBEL
10. Green serpentine: (ophicalcite) Galway.	*Acoraceæ*	c. Pothos. Calla Æthiopica. c. Orontium.
11. Green serpentine: (ophicalcite) Galway.	*Cyperaceæ*	c. Papyrus. Cyperus rigidus. c. Cladium.
12. Mountain limestone: co. Limerick.	*Gramineæ*	c. Bromus. Wheat, barley, oats, dian corn, and su cane (with sparrows c. Rice and canary-gr with buntings, cana and quails.
13. Mountain limestone: Cork.	*Filices*	c. Platycerium. Acrostichum aureum, c. Adiantum.
14. Devonian limestone: St. Mary Church.	*Filices*	c. Hart's tongue, Last cristata. Ferns, Scolopendrium gare, Blechnum bore Lastræa filix mas. c. Mallow.

LOWER ARCADE, (East side, going South).

15. Trap rock: Killerton, Devon.	*Zamiaceæ*	c. Cycas revoluta. Dion edule. c. Cycas revoluta.
16. Quartziferous porphyry: Elvan rock of Trerice.	*Zamiaceæ*	c. Encephalartos. Zamia horrida. c. Encephalartos.
17. Schorlaceous rock: Roche.	*Cupressinæ*	c. Wellingtonia. Thuja siberica. c. Sequoia sempervire
18. Green and Red serpentine: Lizard, Cornwall.	*Abietinæ*	c. Stone pine. Abies excelsa. c. Cluster pine.
19. Red serpentine: Cornwall.	*Araucarinæ*	c. Araucaria Cunningha Araucaria imbricata. c. Araucaria Braziliens

SHAFTS.	CAPITALS AND CORBELS.	
20. Red felopathic porphyry: Inverara.	*Taxaceæ*	c. Dacrydium. Taxus baccata. c. Salisburia.
21. Schorlaceous porphyritic granite: St. Leven's.	*Smilaceæ*	c. Smilax aspera. Smilax sarsaparilla. c. Smilax pseudochina.
22. Black serpentine: Lizard.	*Dioscoraceæ*	c. Small-leaved bryony. Black bryony (tamus). c. Elephant's foot.

LOWER ARCADE, (South side, going West).

23. Gypsum: Chellaston.	*Orchidaceæ*	c. Epidendron cochleatum? Dendrobium calceolaria. c. Cypripedium (lady's slipper).
24. Mountain limestone: Menai Strait.	*Musaceæ*	c. Musa. c. Strelitzia.
25. Mountain limestone: Frosterley, Durham.	*Marantaceæ*	c. Maranta bicolor. Maranta. c. Heliconia.
26. Calcareous breccia: Mendip Hills, Somerset.	*Zingiberaceæ*	c. Alpinia nutans. c. Broad-leaved ginger.
27. Green serpentine (ophicalcite): Rhosglyn, Anglesea.	*Iridaceæ*	c. Iris germanica. c. Gladiolus.
28. Mountain limestone: Hotwells, Bristol.	*Amaryllidaceæ*	c. Narcissus macleagii. Narcissus pseudonarcissus. c. Narc. aurantiaca.
29. Mountain limestone: Garsdale, Yorkshire.	*Amaryllidaceæ*	c. Vallota purpurea. Amaryllis Johnsoni. c. Leucoium.
30. Mountain limestone: Dent, Yorkshire.	*Bromeliaceæ*	c. Pine-apple. Ananassa sativa. c. Lilium lancifolium.

The carving of the capitals and bases of the shafts in the Upper Corridor is not yet completed, nor indeed much advanced, except on the west side. The capitals on that side are selected from the Corolliflorous division of Dicotyledonous plants[b].

UPPER ARCADE,

(West side, going North).

31. Augitic porphyry: Aberdeenshire.
32. Red granite: Peterhead.
33. Grey granite: Aberdeen.
34. Red porphyry, Aberdeenshire.
35. Schorl rock: Cornwall.
36. Red porphyry: Scotland.
37. Green and red serpentine: Lizard.
38. Grey granite: Lamorna.
39. Serpentine: Lizard.
40. Schorlaceous granite: Llanlivery.
41. Grey granite: St. Just.
42. Schorlaceous rock: Llanlivery.
43. Grey granite: Cornwall.
44. Porphyritic red granite: St. Leven's.
45. Serpentine: Lizard.
46. Porphyritic granite: Llanlivery.
47. Serpentine: Lizard.
48. Quartzose rock: Carnmoor.
49. Granite: Carnmoor.
50. Schorlaceous granite: Carnmoor.
51. Porphyry: Loch Tay.
52. Quartziferous porphyry (Elvan): Cornwall.
53. Porphyritic granite: St. Leven's.

UPPER ARCADE, (North side, going East).

54. Mottled limestone: Armagh.
55. Black limestone: Kilkenny.
56. Pale limestone: Armagh.
57. Dark and white limestone: Clonony.
58. Mottled red limestone: Cork.
59. Striped limestone: Clonony.
60. Green serpentine ophicalcite: Connemara.
61. Metamorphic limestone: Dunleary, Donegal.
62. Green serpentine ophicalcite: Connemara.

[b] See p. 39.

63. Red limestone: Cork.
64. Metamorphic limestone: Donegal.
65. Red limestone: Cork.
66. Mottled limestone: Armagh.
67. Black-veined limestone: Kilkenny.
68. Mottled limestone: Armagh.
69. Ophicalcite: Connemara.
70. Black limestone: Galway.
71. Ophicalcite: Connemara.
72. Striped limestone: Ireland.
73. Shell limestone: Castle Espie.
74. Dark brecciated limestone: Ireland.
75. Dark limestone: Tullamore.
76. Dark limestone: Tullamore.
77. Dark limestone: Tullamore.

UPPER ARCADE, (East side, going South).

78. Dolomitic limestone: Mansfield.
79. Dolomitic limestone: Mansfield.
80. Dolomitic limestone: Mansfield.
81. Oolite: Portland.
82. Shelly oolite: Stamford.
3. Shelly oolite: Buckingham.
4. Purple slate rock: Penrhyn.
5. Blue slate rock: Penrhyn.
6. Green slate rock: Penrhyn.
7. Vacant.
8. Granite: Jersey.
89. Oolitic rock: Barrington.
90. Galloway granite.
91. Cornish granite.
92. Galloway granite.
93. Oolite, from Ketton.
94. Blue lias.
95. White lias.
96. Purbeck marble.
97. Purbeck marble.
98. Purbeck marble.
99. Chellaston, gypsum.
100. From Mendip, breccia.
101. From Anston, dolomite.

UPPER ARCADE (South side, going West).

SHAFTS.

02. Mottled limestone: Torquay.
03. Shelly limestone.
04. Mottled limestone: St. Mary Church.
105. Shelly black limestone: South Wales.
106. Mottled limestone: Menai.
107. Shelly black limestone: South Wales.

108. Ophicalcite: Anglesea.
109. Shelly limestone.
110. Ophicalcite: Anglesea.
111. Crinoidal limestone: Derbyshire.
112. Black limestone: Derbyshire.
113. Veined limestone: Derbyshire.
114. Veined limestone: Florence Court, Enniskillen.
115. Mottled limestone: Menai.
116. Madrepore limestone: Frosterley, Durham.
117. Striped red limestone: Plymouth.
118. Dark striped limestone: Chudleigh.
119. Red striped limestone: Totness.
120. Black limestone: Dent, Yorkshire.
121. Crinoidal limestone: Garsdale, Yorkshire.
122. Black limestone: Bristol.
123. Red mottled limestone: Torquay.
124. Oolite mountain limestone: Oreton, Salop.
125. Mottled limestone: St. Mary Church.

The following is a list of the Spandrels in the ironwork forming the roof of the Central Court. Passing up the central aisle from the entrance, then across the far end, and returning down the right-hand side, we meet with the different spandrels in the order in which they are placed and numbered below.

LIST OF SPANDRELS IN THE CENTRE COURT.

8. Chamærops humilis.

7. Carica Papaya.
6. Acer pseudo-platanus.
5. Tilia Europæa.
4. Tussilago Farfara.
3. Æsculus Hippocastanum.
2. Cocos nucifera.
1. Tilia Europæa.

9. Acer pseudo-platanus.
10. Musa Paradisiaca.
11. Quercus Robur.
12. Æsculus Hippocastanum.
13. Platycerium alcicorne.
14. Musa Cavendishii.
15. Juglans Regia.

16. Caryota urens.

THE COLLECTIONS IN THE CENTRAL AREA.

IT will be convenient to consider the Central Area of the Museum as divided into five compartments, or passages running parallel from west to east. The Central Compartment, and the two outer passages or aisles, are wider than the two intervening.

The following diagram will exhibit the arrangement, and the order in which they are referred to:—

	V.	IV.	I.	II.	III.	
N. Corridor.	North Outer Aisle.	North Inner Aisle.	Central Compartment.	South Inner Aisle.	South Outer Aisle.	S. Corridor.
			Entrance.			

Four corridors bound the Central area, and will be afterwards described. They may be called the North, South, East, and West Corridors. The visitor enters the West Corridor from the porch, and then passes into the Central Area.

I.

In the CENTRAL COMPARTMENT of the area twelve cases of stuffed BIRDS will be found arranged, six on either side of the passage. Four other, but smaller cases, project from the side, containing stuffed specimens of MAMMALIAN ANIMALS; there are also specimens placed here and there on the top of the cases, for which space inside was wanting.

Beside these, Six table-cases are placed in the midst of the passage, the first pair[a] (nearest to the entrance) containing specimens of SHELLS only: the next pair containing more shells, and a few specimens of CRUSTACEANS (crabs and suchlike) and INSECTS; and the two last (furthest from the entrance) containing specimens of CORALS and Sponges, STARFISH and Sea Urchins, &c.

At the back of the cases on the right hand, and facing the South Inner Aisle, are cases containing choice specimens of REPTILES and FISH. The collections of British Birds, Reptiles, and Fish, and a general collection of Reptiles, Fish, &c. in spirits, are in the Upper Corridors, which also lead to the Hope collection of Crustaceans and Insects. These several collections will be referred to hereafter. The object of the selection of a few good typical specimens being placed here is to give the visitor at once a general view of the animal kingdom. As divided by Cuvier[b], the animal kingdom was arranged thus:—

a. VERTEBRATA (or *backboned* animals), including the Beasts, the Birds, the Reptiles, and the Fish.

b. MOLLUSCA (or *soft-bodied* animals, generally provided with a shell covering), represented here by the Shells.

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[a] The end drawer of these two cases contains a collection of British Birds'-eggs.

[b] Cuvier's division is so natural that, as a whole, it probably will always be accepted, although the details may be from time to time modified. The fourth division, for example, the Radiata, has lately been divided, and a fifth formed from it, namely the Protozoa, including the Sponges and the minute Infusoria. Some writers also remove the Echinodermata, or Sea Urchins, and Starfish, and place them higher in the range (amongst the Annulosa), leaving the Corals, Sea Nettles, and such-like to be included under Cœlenterata.

c. ARTICULATA (or *jointed* animals), of which the Crustaceans and the Insects are the chief representatives, (now called *Annulosa*, or ringed animals).

d. RADIATA (or *ray-like* animals), including the Starfish, Corals, Sponges, &c.

The above explains generally the arrangement of the contents of the Central Compartment; it may be well, if time permit, for the visitor to examine some of the specimens in detail. For this purpose the following short summary of the contents of the cases is given. The visitor is supposed to pass along the right-hand series of cases, starting from that nearest the Entrance, and returning along the left-hand side.

Cases 1 and 2 contain the *Accipitres*, or Birds of Prey. In No. 1 will be seen fine specimens of the Bearded Vulture, of the wedge-tailed Eagle, and of various other birds of the order, and of the Goshawk. In No. 2 case will be seen the Secretary bird, a very tall bird differing much in character from those around it. In the farthest part of the case is a fine specimen of the Virginian Owl, and a series of the same family, exhibiting great variety.

Cases 3 and 4 contain the *Passeres*. This order includes the Goatsuckers, Kingfishers, Finches, Thrushes, Sparrows, Jays, Crows, and various other forms. The very bright plumage of many will strike the visitor, especially that of the Humming-birds and the Trogons. In the farthest compartment are arranged the Crows and the Ravens, and beneath them Birds of Paradise.

Case 5 contains more specimens of the same division as in the previous cases. Among those which will attract notice are the black and gold Cacicus, and at the bottom of the case the singularly-beaked Hornbills.

Case 6 contains specimens of the "*Scansores*," or Climbing Birds. In this case will be seen the Woodpeckers, the Cuckoos, the curious Toucans, and the brighter-plumaged Parrots, Cockatoos, and Macaws.

Cases 7 and 8 contain the *Columbæ*, or Pigeons, and the *Gallinæ*, which order includes the Jungle-fowl, the Peacock, the Partridges, and the Pheasants. Amongst the latter, at the bottom of the case, will be seen two fine specimens of the Argus Pheasant.

Case 9 contains the *Struthiones*, of which the Ostrich stands as the chief representative. A very fine specimen is placed here, as also one of the rare Apteryx and the Kori Bustard.

In the left-hand part of the same case is commenced the order of the *Grallatores*, or Wading Birds, such as the Heron and the Crane.

Case 10 contains the remainder of the Wading Birds, as the Stork, Spoonbill, &c. Amongst them also will be seen specimens of the Ibis, one of a glorious red colour. The Flamingo should be noticed, and also several fine Cranes.

Cases 11 and 12 contain the last order of BIRDS, namely the *Anseres*, or Swimmers. The common Duck is a representative, but several varieties will be seen. The Penguin, the Pelican, the Gulls, and Petrels, belong to this division, and above all the great Albatross[c].

As has been said, there are four smaller cases projecting from the sides, containing specimens of MAMMALIA. Following the same direction as has been followed in examining the cases of the Birds, and calling the first on the right No. 1, and the one on the left No. 4, we have the contents as follows:—

No. 1 contains some Apes and Monkeys, especially fine specimens of the Chimpanzee and of the Spider Monkey. Beneath in the same case, are varieties of the family of the Dogs; the Lap-dog, the Wolf[d], the Racoon, and the Fulvous Fox.

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[c] The arrangement of the Birds is in accordance with Gray's "*Genera.*"

No. 2 is devoted chiefly to the family of the Cats. We have the Wild Cat[d] and the Panther. On the top of the neighbouring cases we see the Lion, which belongs also to the same division. In the same case are two curious sea-mammals, the Seal and the Sea Bear, &c.

No. 3 (on the left side, returning) contains specimens of the Flying Squirrels, the Jerboa, the Kangaroo, the Beaver, and the Porcupine.

No. 4 contains specimens of the Armadillo, the Sloth, the Ornithorhynchus, and beneath, the Porpoise.

The Six table-cases may be referred to in pairs.

The pair of table-cases near to the Entrance contain the Shells of the Mollusca only. That on the right hand contains the few living representatives of the class *Cephalopoda,* which stands at the head of the sub-kingdom Mollusca. The Sepiadæ or cuttle-fish of our coasts belong to this division, and specimens will be seen in other parts of the Museum, but it is amongst the Fossils, that is, in the remains of extinct animals, that we find the genera and species of the class so numerous. The rest of the same case is filled with the single-shell Molluscs, called the *Gasteropoda,* of which the common Land Snail is a good type, or the Sea-water Whelk and Periwinkle. The numerous and beautiful forms this class takes will at once be seen, but it is impossible to enumerate here the different families into which they have been divided by naturalists.

The case on the left hand contains more of the Gasteropoda. It will be seen how the Limpets and the Dentalia differ from the shells in the other case, but they all belong really to the same class. More diverging still in the outward shape are the Chitons, several of which are shewn on the right hand.

[d] The specimens of the Wolf and the Wild Cat were presented to *the Museum by the* late King of the Belgians in the year 1864.

Of the next pair of table-cases, that on the right contains a selection of the Bivalve shells. The technical name for the series differs with different writers, some naming them *Lamellibranchiata,* others simply Conchifera. It is useful to divide them into two large groups: those which are symmetrical, so to speak, and have two "adductor muscles," such as the common Cockle; and those which are unsymmetrical, and have only one adductor muscle, such as the Oyster. To the former the general name is given of Dimyaria, to the latter Monomyaria. There are, besides, several other modes of dividing them, according to different points in the internal organization, which, however, the shell alone does not always plainly exhibit.

The left-hand of this pair of cases contains a few more of the Bivalve shells, chiefly belonging to the second class named. In this same case a portion is devoted to the sub-kingdom of ARTICULATA, as named by Cuvier, but now usually called ANNULOSA. We see the Lobster and the Crab representing the sea *Crustaceans,* or Crust-covered animals, (the Barnacles representing the *Cirrhopoda,* or Curl-footed); a monster Spider, representing the *Arachnida;* a box of Beetles, Flies, and Butterflies, representing the *Insecta,* (of which a fine and beautiful collection is to be seen in the Hope Museum in the upper Corridor); and some Centipedes representing the Myriopoda (or many-footed). To this sub-kingdom of the animal world also belong the varieties of Worms (*Annellida*), and suchlike, but specimens of these are placed elsewhere in the Museum.

One of the remaining cases in the Central Area is occupied by *Echinodermata,* Starfishes, on one side, *Echinidæ* on the other. The last case to be noticed contains *Zoophyta,* Stony Corals, on one side, Sponges and Corallines on the other.

II.

Quitting the Central Compartment, at the end *nearest to the* entrance, it will be well to visit the

South Inner Aisle, next in order. At the back of the "Birds," as already mentioned, cases containing the Reptiles and Fish will be seen.

The first four cases (passing along the left side) contain the Reptilia:—

Case No. 1 contains a fine collection of *Testudinata,* or Tortoises. One specimen on the top of the case is remarkable for its size; it is supposed to have been not less than 200 years old.

Case No. 2 contains the *Sauria,* or Lizards. Those we see in this climate are very small compared with some of the large Lizards here shewn, such as the Iguana, the curious Moloch Horrida, and the hue-changing Chameleon. On the left-hand side of the same case are more specimens of the *Chelonia,* and with them are specimens of the *Batrachia,* or naked reptiles, which include also, besides the true Frogs and Toads, the Triton and Lepidosiren. These are closely allied to the Reptiles, and therefore are usually placed with them.

Case No. 3 contains the *Crocodilia* (or *Loricata,* i.e. 'scaled'), of which we find typical specimens in the Crocodile proper, the Alligator, and the Gavial. The latter will be recognised by its very lengthened snout.

Case 4 contains the *Ophidia,* or Serpents. The specimens vary in size from the Viper to the Boa Constrictor. One or two fine specimens of the latter are exhibited, as also the skin of a monstrous specimen.

Case No. 5 contains specimens of the largest division of Fishes, namely the *Teleostea,* or "perfect-boned" fishes. Amongst them will be seen the Swordfish and a specimen of the Flying-fish.

Case 6 contains in the upper part of the right division the circular-mouthed fish (*Cyclostomata*), such as the Lamprey. Below these are the Cartilaginous fish (*Selachia*), such as the Sharks and the Rays. In the left-hand division of the same we find in the central portion one of the *Ganoidea,* or fish having bony and enamelled scales. It is singular that living species are comparatively scarce, while among the Fossils they are most common; indeed for long periods no other kind of fish seem to have existed. Their chief representative is the Lepidosteus, or bony pike, of the American rivers. On the shelf below these are the curious Hippocampi, or Sea Horses, as they are termed. Both in the upper and lower part of the case are specimens belonging to the *Teleostea*, already named. At the bottom of the case are specimens of Eels, and the like.

Crossing to the other side of this Aisle, and examining the cases which are arranged along it, the visitor will see that they contain from beginning to end a series of large bones of extinct Reptiles, larger even than the largest living Crocodile ever met with. There are many kinds, but nearly all the specimens are from the immediate neighbourhood of Oxford.

Case No. 1 contains selected remains of the Ichthyosaurus, and amongst them will be seen one specimen containing the bones nearly if not quite complete, of the animal, all lying together.

Case 2 contains in the first portion selected specimens of Ichthyosaurus, and in the second vertebræ, paddles, and other parts of Plesiosaurus.

Cases 3, 4, and 5 contain remains of several remarkable Saurians. Plesiosaurus in great variety, one remarkable jaw, and many paddles, in cases 3 and 4. Steneosaurus and Teleosaurus in 4. In case 5 is the matchless thigh-bone of Cetiosaurus, from the limestone quarries some eight miles north of Oxford. The Steneosaurus and Teleosaurus will also be observed with the long snout, like the Gavial in the case opposite. Many of these fossils are obtained from the clay-pits of Shotover (Plesiosaurus and Steneosaurus), others from Stonesfield and Enslow Bridge (Teleosaurus).

Case 6 is devoted to remains of the Megalosaurus, or Great *Saurian, a name given* by Dr. Buckland. The specimens all come from the limestone beds of Stonesfield, near Oxford. There are portions of several different animals, as it is very seldom that two bones are found lying together. When alive, an ordinary-sized specimen must have been about thirty feet in length, although, from the imperfection of the remains which we possess, it is not possible to be sure as to the exact size. It inhabited the land chiefly, but no doubt at times sought its prey in the waters. The teeth are minutely serrated on the edge.

III.

Passing round the end of the series of cases into the next Compartment (that is, the South Outer Aisle) the visitor will find the first four cases at present occupied by rocks and large crystallized masses, illustrating mineralogy. The last two are devoted to a few typical fossils, of which the complete collection is placed in the East Corridor.

Down the centre of the Compartment are arranged ten large table-cases, illustrating the MINERAL KINGDOM. The specimens have the names attached to them, but it may be well to point out some of those which will possess perhaps more interest for the general observer.

Case 1 (beginning at the west end) contains specimens of native Metals; amongst them will be seen Gold, Silver, Copper, Iron, Arsenic, Antimony, &c. In the same case are compounds of Sulphur with the heavy metals.

Case 2 contains Chlorides, Fluorides, and Oxides. Of the second the specimens of Fluor Spar cut into vases will be noticed.

Case 3 contains more Oxides of metals, especially of Iron and Tin; also varieties of Quartz, such as the Amethyst, Jasper, &c.

Case 4 contains great varieties of Agates. Specimens of the Onyx, Opal, and other precious stones will be noticed. In this case, too, the "Saline Stones" begin. First of all the Carbonates. Amongst the Carbonate of Lime will be seen the refracting Iceland Spar, as also the opaque Stalactites which are found in most limestone caverns.

Case 5 is very attractive from the beautiful Carbonates of Zinc and Copper. Amongst the latter the green Malakite will be observed. In the same case are examples of Silicates, many of which enter into the composition of the igneous rocks. Here will be seen the inflammable Asbestos, and of precious stones the Topaz, Beryl, Emerald, and Garnet.

No. 6 contains more Silicates. The Labrador Felspar, with its varied and bright hues, will be noticed; also Obsidian Mica, and varieties of Tourmaline.

No. 7 contains compounds of Oxygen, of which there is exceedingly great variety. Several specimens of copper ore will be seen in this case.

No. 8 contains specimens of Marbles and Conglomerates, or broken rocks of different character massed together into one whole. One part of the case exhibits specimens of the different limestones and sandstones used in the construction of the Museum.

No. 9 contains rocks of *igneous* origin, as distinguished from the above, which are sedimentary, or *aqueous* rocks. The most familiar are such as Granite, Syenite, Greenstone, &c.; also the Lava from Volcanic Mountains. There are also specimens of rocks which appear to have been deposited in water, and yet by the action of heat have lost their sedimentary character; these are called *Metamorphic*, such as Gneiss, Mica-Schist, &c. In the same case are a few specimens of "Septaria," or Nodules, into which water highly charged with lime has infiltrated and produced very curious forms and colours.

No. 10 contains familiar examples, shewing the rocks which *we make use of* in our arts and manufactures. We see first of all Coal, then Building Stones and Slates. In the latter examples the curious fact is to be noticed that the Slates do not split in the direction of the deposit, but across it. The lines of deposit will be seen on the side of the Slates, shewing this more clearly than can be described in a few words.

IV.

Having concluded the examination of the specimens on the south side of the Museum, it will be found convenient to cross over to the NORTH INNER AISLE, and again to start from the end near the entrance and pass along the cases on the right-hand side, returning by those arranged on the left-hand side. As before, there are six cases on each side; there are also specimens too large for the cases lying in or suspended over the centre of the Compartment. It will be seen at once that the specimens here arranged are but the SKELETONS of the animals. The sub-kingdom of the Vertebrata only can be said to have a true skeleton, and therefore in this series we shall, as before, have to examine in order Beasts (i.e. Mammalia), Birds, Reptiles, and Fishes. The series begins with the first and highest of these divisions. For the skeletons of the Birds and Fishes the visitor will have to pass round into the next Compartment.

Case 1 (beginning on the right hand) is labelled Bimana, i.e. animals having two hands only. It is the first order of Mammalia, containing but one genus, that of man. A few specimens are given also in the next case.

Case 2 contains the *Quadrumana,* or four-handed animals, such as the Apes and Monkeys. It is impossible in so brief a summary to stop to point out the analogies or the differences, *but it is well worth* the visitor's while to give some attention to the specimens here shewn side by side, and consider the varied forms in connection with the varied purposes which the limbs, &c. have to serve.

Case 3 has one part devoted to further specimens of the *Quadrumana;* but the left-hand part contains examples of the *Cheiroptera*, or "Hand-winged" animals, such as Bats; and the *Insectivora*, or Insect-feeders, such as the Mole, Hedgehog, &c.

Cases 4 and 5 contain the *Carnivora*, or Flesh-eaters. Amongst the specimens will be seen the Lion, the Bear, the Wolf, the Dog, the Badger, &c.

The right-hand portion of Case 6 is also occupied by additional specimens of the *Carnivora;* the left-hand portion exhibits the skeletons of *Cetacea*, or Whales. The larger specimens of Whales are placed in the centre, two of which are suspended, and two laid on the floor, but in the cases will be seen examples of the Porpoise, Dolphin, &c.

Crossing over and returning towards the Entrance along the northern side of the Aisle, the series of articulated skeletons of the other divisions of the Mammalia are continued, in the following order.

Case No. 1 contains *Proboscidia*, the representative being the Elephant, of which various parts are shewn. In the centre of the aisle are two specimens articulated, that is, with their bones arranged in the proper place. One is of a large adult, the other, of a small young Indian Elephant. The left-hand division of the same case contains the commencement of the *Perissodactyla*, that is, the "Uneven-toed," or animals having one, or three toes on their hind feet, such as the Horse, Rhinoceros, &c.

Case 2. Here the *Perissodactyla* are continued.

Cases No. 3, 4, and 5, contain the *Artiodactyla*, or "Even-toed," or animals having two or four toes on both fore and hind feet, such as the Ox, Sheep, Pig, Hippopotamus, &c.

Case No. 6. Part of this is devoted to a continuation of *the Artiodactyla;* the remainder contains the "*Bruta*," such as the Armadillo.

V.

The visitor has now remaining the NORTHERNMOST AISLE of the Area to examine before he passes into the Corridors. Beginning at the end nearest to the entrance, and examining the case at the back of that just described, he will see—

Case 1, in part devoted to the *Rodentia,* or Rodents, such as the Rabbit. There is a foreign species which is of very large size, the *Hydrochœrus Capybara,* a specimen of which stands at the bottom of the case. The left-hand portion contains the *Monotremata,* or Single-vent animals, a very small division; and the *Marsupialia,* or Pouched animals, such as the Kangaroo. These latter are placed in the lowest division of the class Mammalia, and after them, descending in the scale, come the Birds.

Cases 2 and 3 contain the *Aves,* or birds: the smaller birds are to the right, and the larger, such as the Ostrich, Crane, &c., are to the left. Between the cases, on a separate table, are some remains of a bird which has become extinct within the last two or three centuries, namely the Dodo. A very accurate painting exists, and with the remains here exhibited naturalists are able to describe the bird very definitely. It belongs to the Pigeon family.

In Case 4 are placed the *Reptiles.* As in the Southern Aisle (II.) the stuffed specimens were visited after the birds, and before the fish, so are the skeletons arranged here in the same way, thus affording opportunity of comparison in either direction. The case contains perfect specimens of the heads of the Crocodile and Gavial. Also the structure of the *Chelonia,* or Turtles and Tortoises, is admirably exhibited.

Case 5 contains some more *Reptilia.* The *Lacertilia,* or Lizards; the *Ophidia,* or snakes; and last of all, the *Batrachia,* or naked non-scaly reptiles. On a separate table a beautiful example of the Python is shewn, and on examination it will be seen that one of the ribs has been broken and repaired during the animal's lifetime.

The left-hand portion of the same case, as well as

Case 6, is devoted to the lowest of the four divisions into which the Vertebrata are divided, namely, the Fish. The Pike and Turbot will be easily recognised; and to the right, the large Shark's jaws, armed with sharp cutting teeth. At the bottom of the case, on the left, is a beautifully mounted specimen of the Tunny Fish.

The visitor has now completed an examination of the Vertebrate Animals. First of all he has seen them with their natural covering, and then he has seen the structure of their skeletons. He has already noticed in the central aisle a few specimens of the animals belonging to the remaining sub-kingdoms, such as, for instance, the Mollusca and some specimens of the Articulata; but here he will find arranged a more perfect collection. In the case of the Mollusca the hard shelly coverings can be easily preserved without much care, but the soft parts, i.e. the animals themselves, which are here shewn, are in order to prevent decay kept in spirits. Before examining these specimens there are two table-cases to be looked at.

One, a small case, containing a typical set of specimens arranged by Mr. ROBERTSON, shewing at a glance the principles on which naturalists divide the animal kingdom. The examples are arranged on stages, and are fully labelled.

The other is a long table-case, exhibiting also typical specimens for the sake of comparing the different sub-kingdoms, orders, and classes, into which the animal kingdom is divided. The connection between the Starfish and the Sea Urchin, or Echinoderm, and the differences in the Crab and Lobster, are here *shewn by specimens;* as also other analogies and differences in *the animal kingdom.*

Next to this is placed the case referred to above, containing the representatives of the animal kingdom below the Vertebrata. The MOLLUSCA are first seen; the right-hand projection shewing the (1) *Cephalopoda,* including the Nautilus, Sepia, and suchlike. Next the (2) *Gasteropoda,* of which the land and freshwater Snail, or the Sea-Whelk and Periwinkle, afford common examples. On the left, the (3) *Lamellibranchiata*—a large division of the Bivalve shells—are arranged. The Freshwater Mussel, the Sea Oyster, and Cockle, and all suchlike Bivalve shells, belong to this division. On the south side of the cabinets the series is continued. The *Brachiopoda,* or Arm-footed shells, and the *Tunicata,* that is, Molluscs which are surrounded by a kind of sack, instead of a shell. This completes the MOLLUSCA, but in the same shelves are arranged the *Polyzoa,* sometimes called "sea-mats."

The animals belonging to the next sub-division are called "ARTICULATA." Here the *Crustaceans,* such as Shrimps, Crabs, &c., are seen, and the *Insecta,* or Insects, which perhaps comprise the largest number of species of any class in the animal kingdom as at present subdivided. Of these only a few typical specimens are given, shewing the principles of their structure. The large collections, shewing the varieties of the external form and colour, have a room allotted to them in the Upper Southern Corridor.

On the right-hand projection of the western side are arranged the *Annellida,* or Worms, and wormlike animals, (not having a backbone, like snakes, but *rings*). In this case will be seen Organisms which are usually ranked lower than the Articulata and Mollusca, namely, the *Cœlenterata,* such as Corals, and the *Protozoa,* such as Sponges, &c. The *Echinodermata* and Starfish are placed between these and the Articulata.

Two long table-cases follow next; these contain specimens of external coatings provided by nature, of hair, feathers, scales, &c., and internal coatings and tissues.

Then another important series of cabinets, arranged in the form of the letter H. The object of them is to exhibit the organs of animals. The visitor has seen the various external appearances, and next the bone structure. Here he sees the internal organisms by which growth is promoted and life sustained. The cases are all labelled, and the specimens classified, and carefully catalogued and described in most instances. The visitor will see first some specimens shewing the *Connective* system and then the *Tegumentary* system. Here begin also the organs of *Sense,* which are continued on the left-hand side.

Next in order are the organs of the *Nervous* system, and on one side will be seen beautiful preparations, exhibiting the brain. Passing round to the back, the organs of the Nervous system are continued, as well as other organisms. Organs of *Absorption,* Organs of *Circulation,* and Organs of *Respiration* complete the series in this collection of cabinets, which is continued in the series of cabinets beyond, where the visitor will see arranged in the same manner Organs of *Motion* and Organs of *Digestion.*

Between the two cabinets are placed two table-cases, containing a choice selection of typical examples so arranged as to shew the principles of classification adopted as regards parts of the Vertebrate Skeleton. One case is devoted entirely to the Teeth, and in the other the "homology" of the several parts of the skeleton one with another is shewn.

Two smaller cases remain to be noticed, one containing a Crocodile, beautifully articulated, and some other examples of Reptilia, in the same case; and the other a specimen of a large and rare fish, the Tunny.

The table at the end contains a Pathological series of Crania of the human species, viz. part of the Pathological Series contained in one of the Western Rooms.

NORTH CORRIDOR.

Arranged in cases against the outer wall of this corridor is an Ethnological Series, containing an extensive Series of Human Crania, illustrations of Ethnology; to this the attention of visitors is specially directed.

EAST CORRIDOR.

In the Central Area of the Museum the visitor has surveyed the Animal Kingdom almost entirely with regard to living forms. In this corridor he will find many and valuable illustrations of the several extinct forms of life.

The object kept in view in the arrangement of these fossils—or remains of animals and plants which have lived and died and been enclosed in the successive layers of the earth's surface—is to shew in one connected series the succession of the varieties of life on the earth.

The series is divided into *Palæozoic*, or ancient life; *Mesozoic*, or middle life; and *Cænozoic*, or recent life. Under each, subdivisions are introduced, such as *lower*, *middle*, and *upper*. The visitor will understand that he is following an upward course, namely, from the more ancient to the more recent.

Cases 1 to 4 contain *Lower Palæozoic Fossils*.

This, the earliest series of life known to us, is mostly composed of marine forms, only a few land plants having as yet been discovered in the uppermost layers. The whole may be regarded as one grand series of marine invertebrata (fishes only occurring in the upper part); beginning with a few species in the linguline and lower, and ending with a few in the passage beds. The earliest forms of life include but few classes; as (1a.) *Algæ*, (marine plants); (2a.) *Histioderma*, (Annellida); (2b.) *Olenus* and *Hymenocaris*, (Crustaceans); (2c.) *Oldhamia* (Polyzoa?); (3c.) *Lingula*, (Brachiopod, Molluscs). Before the close of the

Lower Palæozoic period, all the classes of invertebrata had been called into existence, though in very unequal proportions, Zoantharia, Brachiopoda, and Crustacea being most numerous.

Cases 5 and 6 contain *Middle Palæozoic Fossils.*

The strata called Old Red Sandstone in Scotland yield a large number of fossil fishes, some of them very singular in form, but hardly any other fossils. On the contrary, strata of the same great period (if not exactly coeval) in Devonshire, and Russia, and in the valley of the Rhine, yield abundance of invertebrate fossils, and fewer fishes. Devonshire is particularly rich in corals of this age, of which a large number and fine series has been added to the Bucklandian collection by the liberality of Miss Burdett Coutts. In neither of these tracts have land plants been commonly found, but in the south of Ireland, in the upper part of the old red sandstone series, very finely preserved large fronds of ferns occur, with what are thought to be freshwater shells allied to the bivalves of our ponds and rivers. Specimens of the Ferns will be seen over the cases.

Cases 7 to 12 contain *Upper Palæozoic Fossils.*

For convenience, the strata of the Carboniferous system may be grouped in two grand divisions; the upper being called Coal Formation, the lower, Mountain Limestone. In the coal formation of Nova Scotia, air-breathing animals have been found; viz. a Myriopod, a Mollusk, and several reptiles. In Germany, Scotland, and England, a few reptilian remains are recorded.

Cases 11, 12 contain *Plants.*

The numerous remains of stems, roots, leaves, and fruits of plants which occur in all coal-fields, have been variously classified by botanists. The tribe of Ferns has been universally recognised, and is very abundant: Palms have been, with some doubts, admitted as rare. Among the more frequent and conspicuous trees were the branching *Lepidodendra,* and the columnar *Sigillaria,* of which the repent *Stigmaria* was the root. The *climate in which* the European specimens grew is generally allowed to have been such as might admit of tree ferns, but not necessarily of higher temperature. The situation of growth was mostly in marshy land near the mouths of rivers. Coal is derived partly from plants growing on the spot, partly from vegetable matter drifted from small distances.

Cases 13 and 14 contain *Lower Mesozoic Fossils.*

In the British Isles there are few remains of this age, excepting of the Reptilia. On the Continent, in Germany, France, and Italy, this series of strata, often called *Trias,* is naturally grouped in three divisions, viz.:—

Keuper. Coloured marls and sand, with few fossils.

Muschelkalk. Limestone with marls, salt, &c., and many fossils, especially *Ceratites,* and the Lily, *Encrinite.*

Bunter. Red and white sandstones, with very few fossils.

In the upper part of this series, in Wurtemberg, occur teeth of a small mammal (*Microlestes*), the earliest yet known. Teeth of the same genus have been recognised by Mr. C. Moore in a corresponding part of the series near Frome.

Cases 15 to 20 contain *Middle Mesozoic Fossils* of the Lias.

As might be expected, the boundary between the lower and middle Mesozoic strata, which seems marked by strong characters in England, loses this distinctness when the survey extends over other countries. In the vale of the Severn, several thin, sandy, argillaceous, and calcareous strata, including one or more layers rich in bones of fishes and reptiles, have lately been separated from the true Lias, with which they agree pretty well in mineral character, and joined to the *Trias.*

They resemble in respect of invertebrata the uppermost beds of the *Trias,* as it appears on the flanks of the Alps; and on this account receive the title of Rhœtic beds.

The Museum contains few of these remains, except from the bone-bed of Aust, and the insect-beds of Westbury.

In the Museum the numerous fossils of the *Lias* are kept separate from those, equally abundant, of the Oolites, for convenience; some species are common to the two sub-systems, as might be expected from the conformity of the deposits and some analogies of mineral character; the Lias clays being analogous to the Oxford and Kimmeridge clays, and the Liassic marlstones and ironstones being similar in some respects to the Oolites; which however, are, as a whole, more calcareous, while the Lias is more argillaceous. In both sub-systems the abundance of organic forms in almost every class of the animal kingdom, excepting birds and mammalia, is very striking: the rocks are full of them. Neither birds nor mammalia are plentiful anywhere; yet in the Bath Oolite at Stonesfield marsupial and insectivorous mammals have been found; and at Solenhofen, a singular feathered creature, perhaps more bird than reptile, has lately been brought to light.

Plants abound in certain districts both of the Lias and Oolites. See Cases 15 and 21.

Case 17 contains Belemnites and Ammonites.

Case 18 Lepidotus, and other fishes.

Case 19 *Plesiosaurus.*

Case 20 *Icthyosaurus.*

Cases 21 to 28 *Middle Mesozoic Fossils* of the Oolites and Wealden.

Case 21 Plants.

Case 22 Corals and *Echinodermata.*

Cases 23 and 24 Bivalve and Univalve shells.

Case 25 Belemnites and Ammonites.

Case 26 Fishes of the Placoid and Ganoid orders. *a.* Fishes of the Wealden. *b.* Fishes of the Oolites—scales, fin-rays, vertebræ, &c. *c.* Fishes of the Oolites—jaws and teeth. *d.* Fishes of the Oolite and Wealden deposits.

Case 27 *a.* Vertebræ of Plesiosaurus (a reptile), from Shotover Hill. *b.* Icthyosaurus—vertebræ and coracoids. *c.* Pliosaurus—vertebræ, teeth, bones of the limbs: Shotover Hill. *d.* Steneosaurus—head nearly complete, lower jaws, teeth, vertebræ, femora: Shotover Hill.

In Case 28 are some specimens to be particularly noticed, namely of the *Megalosaurus*—the lower jaw, teeth, vertebræ, and a metatarsal bone. For a large series of bones of this large reptile, see the separate case, already referred to, in the Central Compartments. Of the *Pterodactyles*, from Stonesfield, the parts represented are chiefly bones of the anterior limbs, destined for flight; and lastly, of the celebrated *Insectivorous Mammals* of Stonesfield, are specimens of the lower jaws: no other parts have as yet been found. One of the genera is regarded as marsupial; perhaps both may be so regarded.

Cases 29 to 32 contain *Upper Mesozoic Fossils*.

Like the Lias and Oolites, the Green Sand and Chalk constitute one great system in two parts or sub-systems; viz. the Chalk series, and the Green Sand series.

Somewhat younger than the Upper Chalk of England is the Chalk of Maestricht.

In the Museum the fossils of these two groups of strata are classed in one series, but placed separately on the shelves for convenience of inspection. Several species are common to the Upper Green Sand and Chalk.

In this system of strata many groups of Mesozoic fossils die out, or cease to abound, as several genera of Echinodermata, Belemnites, Ammonites, and the great Saurian races of Ichthyosaurus, Plesiosaurus, Iguanodon, &c. The marine deposits being little varied by estuarine admixture in England, few land plants occur. But the case is different in some foreign localities, where dicotyledonous plants are found in considerable plenty.

Sponges are very frequent in this system, both in the Upper Green Sand, and in the Upper Chalk. They form often the skeletons of flint nodules lying in layers. Flint also occurs in flat expansions, and even in vertical or inclined plates. Green silicate of iron (decomposed angite?) occurs in the Lower Chalk, and in the Green Sands and Gault.

For the Fossils contained in the strata above the Chalk the visitor will have to pass to the Upper Corridor. They will be referred to in their place.

SOUTH CORRIDOR.

In continuing the walk round the Lower Corridor he will observe that the cases on the south side are filled with models and appliances for illustrating the principles of Natural and Experimental Philosophy. As he passes he will see models for illustrating the laws which regulate Air, Light, Sound, Steam, Mechanical contrivances for increasing force, the Atmosphere, Galvanism, Electricity, and many other effects which depend upon laws illustrated and explained by this branch of science.

The visitor has now again reached the

WESTERN LOWER CORRIDOR,

in which is the entrance. To the left of the entrance is the Pathological Department. The Physiological student may in the Series herein forming commence the study of those Causes and Actions which lead to Death; without a knowledge of them the history of a Living Being is, of course, incomplete. A Laboratory for Sanitary, Toxicological, and Therapeutical purposes is in course of preparation here. He should now mount the staircase at the north-western corner of the Museum, which will lead him to the *Upper Corridors.*

THE UPPER CORRIDORS.

Along the Northern Upper Corridor are placed cases containing an arranged series of the British *vertebrata.*

Between the two doors leading into the Large Lecture-room are cases containing Fish, and beyond these, others containing a large collection of Birds.

The visitor next comes to the East Corridor, where the series of the Fossils already examined in the Corridor beneath are continued. The visitor will still pass from the lower to the upper strata, as he goes from left to right, that is, from earlier forms to those more allied to living forms, and last of all to many living forms of life.

The degree of affinity between the fossil and recent kinds of organic beings has been employed by Sir C. Lyell, as the basis of a classification of the Cænozoic strata into Eocene, Meiocene, and Pleiocene,—terms which express the degrees of affinity. This classification is convenient, and may be replaced when we choose by upper, middle, and lower. The uppermost and latest portion has received the name of Pleistocene. The middle stage, Meiocene, is supposed to be recognised at Bovey Tracey and in the Isle of Mull, by plants; and a portion of the fluvio-marine strata of the Isle of Wight has also been referred to it by some writers.

Next follows a series of Foreign Mammalian remains from marine, fluviatile, and lacustrine deposits of various age. These are placed with reference to their geographical distribution, a circumstance of less importance in the older deposits.

Finally, the collections of bones from caves and fissures, which form a conspicuous part of Dr. Buckland's collection, and illustrate his special labours and opinions, complete the Cænozoic series, and bring down to historic date and human occupation the long and varied series of ancient life.

Thus the present system of nature is connected with the past by a chain of continuous life, stretching far back into the supracretaceous period. Very late in this period is the appearance of the creatures specially serviceable to man; whose most ancient remains are confined to the latest superficial deposits, such as sea-beaches, river gravels, peat-bogs, and caverns in limestone, often previously inhabited by gigantic species of carnivorous quadrupeds.

Cases 33 to 38 contain *Eocene* Fossils, chiefly Shells, but Crustaceans and teeth of Fish are also seen. Cases 39 to 40 contain *Pleiocene* Fossils, and Case 41 *Pleistocene* Fossils, in which most of the species are identical with those now living. In Case 42 are collected Foreign Fishes and Mammalia.

Cases 43 to 45. The FOREIGN specimens, mostly MAMMALIA, from valley sediments, which occupy Cases 42 to 45, are placed principally according to locality—the most convenient rule probably in regard to all Cænozoic Fossils. Though in several cases (as in the Val d'Arno, and at many places in the valley of the Rhine, and in England) shells, often of fresh-water, sometimes of marine origin occur, it happens that the Oxford collection contains but few examples of them.

Pachydermata (according to the classification of Cuvier) are the prevalent Fossils; *Perissodactylous* genera (according to Owen) being most frequent in the early Cænozoic period. *Cetacea* are not, as perhaps might have been expected, very common. The geographical distribution of these forms offers so much of analogy with that of corresponding races now living, that each species, and even genus, had but a limited range. *Palæotherium* and *Anoplotherium* belong mostly to the basins of Paris and Hampshire; *Deinotherium* to the valley of the Rhine; *Lophiodon* prevails in the south-east of France; *Anthracotherium* in Switzerland. The somewhat later genera of Mastodon, Rhinoceros, Hippopotamus, and Elephant, have a wider distribution in circumpolar regions.

Elephas primigenius is more widely spread than either of the living species; and it is found fossil in regions distinct from those in which the others now live.

We may regard these remains—numerous though they are—

as but a small portion of the mammalian dwellers on the land which stood above the sea in the Cænozoic period; the imbedding of the bones of quadrupeds in sediments of rivers, lakes, and the sea, being obviously rare and exceptional.

Cases 46 to 50. The specimens in these cases are of MAMMALIA from the British Islands; mostly from gravel, peat, or clay, deposited by rivers or lakes in actual valleys, or by some greater water-streams in situations to which ordinary floods could not reach. Among the most frequent of these Mammalia, are remains of the Elephant, or rather of two species of Elephant, one of which, frequent in Norfolk, in deposits of 'pre-glacial' date, receives the name of *E. antiquus.* This elephant, whose remains are rarely found in the Thames valley, was contemporaneous in this region with *E. primigenius,* the true Mammoth. Remains of the Mammoth were found at Hoxne in Suffolk, with flints like those at Amiens, which are believed to have received their form by the hands of man. Flints from Amiens, collected by Mr. Prestwich and Prof. Phillips, with other specimens from Aurillac, Les Eyzies, &c. with carved bones, &c. appear in the small glass cases on the corridor wall.

Cases 51 to end contain a large and varied series of Mammalian Fossils from Caverns. Such caverns are sometimes situated on the margin of the sea, but more often in the sides of valleys inland. They have not been filled with bones by one process only. Hyænas living in some dragged into them animals and parts of animals. Bears retired to die in others. Bones of ruminant and other animals have been drifted into several complicated caverns by the force of water. Flint implements, pottery, and human bones, have been found in several of the caverns, and have caused much discussion as to the date of their sepulture as compared with that of the extinct mammalia.

In the last cases are specimens illustrating the action of lime, such as stalactites and stalagmites; deposits from water in wooden pipes; oxidation of lead, iron, &c., to shew changes now in progress; calcareous deposits from 'petrifying' springs, on metals, birds, nests, eggs, horns, crawfish, &c.; a specimen of the 'Sunday-stone,' and Tufaceous deposits from springs near Oxford, on *Chara* and other plants.

In the Southern Upper Corridor is placed a series of cases containing Tortoises, Serpents, Reptiles, Fishes, Starfishes, Mollusks, and other marine productions, preserved in spirits. Here also are the Hopeian Entomological Library, and the Hope Collection of insects, and other articulated animals, the greater portion of which are preserved in Cabinets, which are necessarily closed to prevent the specimens being injured by the action of the light; but which may at all times be inspected for the purposes of study on application to the Professor of Zoology in the adjoining library. Numerous objects illustrating the natural history and economy of many interesting species of insects are exhibited in the table-cases in this apartment, as well as in the cases in the adjoining Corridor itself.

Among these may be mentioned the Trap-door Spiders and their nests, the Leaf-cutter Bee, the White Ants and their nests, including the prison cell of the queen; the insects which produce shellac, cochineal, ink-galls; various kinds of silk-producing insects and honey-bees, together with an extensive collection of the nests of Hornets and Wasps, one of the latter being of gigantic size, formed by several colonies of the common Wasp, which worked in company in its construction. In the drawers of the large central table-case is arranged the unrivalled collection of *Crustacea* formed by Professor Bell, presented to the University by Professor Westwood. In the table-cases near the windows are arranged an extensive series of fossil insects, and insects preserved in amber and gum animé, and also various *large species of Crustacea,* including Lobsters, Prawns, and various species of Crabs, amongst which are some large Hermit Crabs, which reside in the empty shells of Molluscous animals in consequence of the soft and fleshy structure of the hind part of their bodies. Various remarkable species of insects in the perfect state are also exhibited in the table-cases, including the gigantic Goliath Beetle, from tropical Africa; many species of walking-stick and walking-leaf insects (*Phasma* and *Phyllium*), large exotic species of Butterflies, and a curious collection of leaves, prepared by Mr. S. Stone, shewing the action of different minute species of Caterpillars, by which the *parenchyme* of the leaf is consumed, the insects forming small tortuous galleries within the substance of the leaf. The room is ornamented with portraits of Linnæus, Kirby, and Mr. Hope himself, together with busts of Linnæus, Cuvier, Reaumur, Labreille, and Yarrell.

In the Western Upper Corridor is the entrance to the Library. A door is especially set apart for visitors to enter to see the Library without disturbing the students.

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